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SPECIAL REPORT: The Out of Touch CIO PAGE 30

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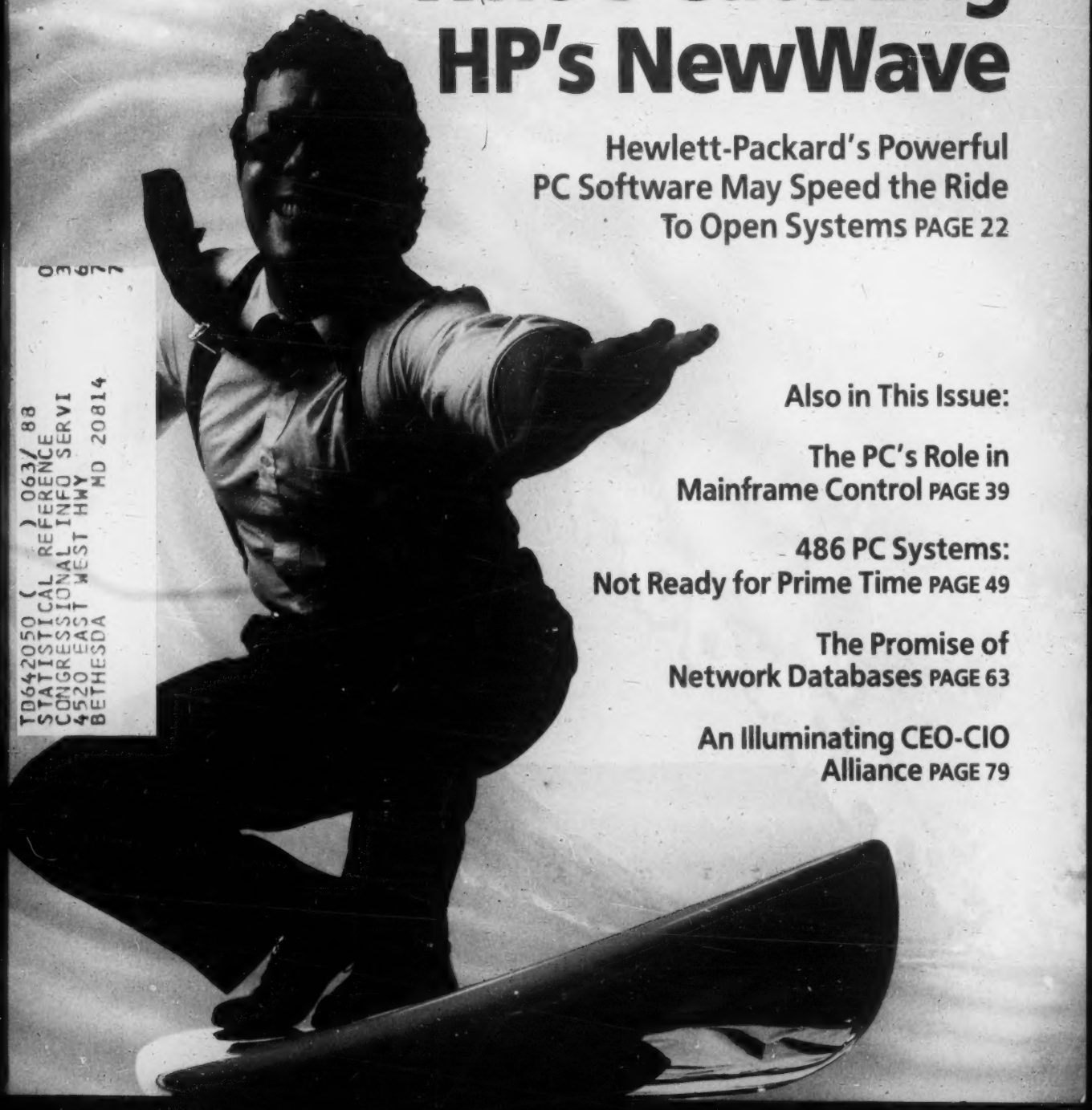

Who's Catching HP's NewWave

Hewlett-Packard's Powerful PC Software May Speed the Ride To Open Systems PAGE 22

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DATAMATION

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COVER STORY

Surf's up for Hewlett-Packard's vision of an object-oriented software environment.

Who's Catching HP's NewWave 22

BY JOHN McMULLEN The newest NewWave ships this month. Just how big a splash it makes as an open systems environment depends largely on how well Hewlett-Packard's software strategy is embraced by former competitors.

Cover photography by David Bradley

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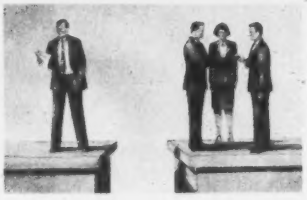

The Out of Touch CIO 30

BY RALPH CARLYLE The latest Coopers & Lybrand/DATAMATION survey of chief information officers reveals that CIOs are dangerously disconnected from the business side of the house, customers and the executive's own users.

INSIGHTS ON DISTRIBUTED COMPUTING

With the PC front end, we're freeing up our data center people to make the data center more efficient, and we're also able to keep our support cost down as we move toward supporting that second data center.

Howard Taylor
Manufacturers Hanover Trust Co.
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The demands of these new computing environments will require a broader vision by MIS managers than simply linking PCs to mainframes, and HP's model is one of the first indications of this.

William F. McSpadden
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I thought we needed better networking, but what I found was that the networking was good—almost too good. There was no control of the information.

Jeffrey Kent
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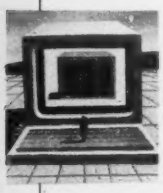

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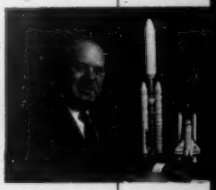

BY RALPH CARLYLE When is decentralization a bad idea? When you're spending as much on IS each year as your net earnings and your IS staff is duplicating work.

For Martin Marietta's Wiltshire, separate is out and integrations is in.

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BY TONY COLLINS The collapse of Atlantic Computers, has left users painfully aware that it is they who will pay.

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The Rising Tide of Openness

When John Young, the president of Hewlett-Packard Co., gave the keynote address to UniForum earlier this year, his message was simple and practical. He told the UNIX conference that the benefits of open systems—as embodied in UNIX and other software that could run on different types of computer equipment—were undeniable from both a strategic and economic point of view. But, he said, to assume that this open world was the only world was a serious mistake.

Young said that open systems advocates and companies such as HP must build bridges to older, proprietary worlds. To think that user organizations would simply throw out existing systems and embrace open systems was absurd; investments are simply too great for that to happen. Young's message certainly makes a lot of sense for companies such as HP; you'd expect as much from established vendors that built businesses on proprietary computer designs.

Photograph by David Bradley

McMULLEN rides the NewWave

And HP's recent actions with its NewWave graphical user interface put substance behind the words and show that the company is serious about building the bridges that president Young talked about. Originally developed jointly with Microsoft Corp., NewWave, which runs with the popular Microsoft Windows program, has won the support of AT&T, Data General Corp. and NCR Corp. These companies intend to use NewWave as a front-end desktop tool with their own office automation software offerings. At the same time, HP is attempting to recruit independent software suppliers to write applications programs that will use NewWave capabilities.

The potential benefit of all this activity to you, the IS professional, is summed up by our San Jose-based associate editor, John McMullen, in this issue's cover story. "Now that HP and its partners have further articulated their future NewWave plans, it's clear that NewWave is more than just a sexier version of Windows," he writes in "Who's Catching HP's NewWave," page 22. "Rather, it's a vision of an open systems world incorporating applications running across a wide universe of possible platforms."

If that's the case, and HP and others are able to really craft the open systems world they envision, the result will be a rising tide of choice and capability that will spread computing much further and wider than it reaches today. And perhaps that's the real message in Young's UniForum address.

Pity the Poor CIO

You've the read the stories in the general business press. The chief information officer is an endangered species, an executive in search of a function. The latest Coopers & Lybrand/DATAMATION survey of CIOs reveals what the problems are inside the executive suite. Our Special Report this issue, "The Out of Touch CIO," page 30, examines how disconnection from the business side of their companies, their customers and their own IS users is undermining the CIO's position. The message to all CIOs, or those that perform the function, is heed the warning signs: your IS future is at stake.

David R. Brousell, Editor

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SPECIAL REPORT
MANAGEMENT SURVEY

The Out of Touch CIO

The latest Coopers & Lybrand/DATAMATION survey of chief information officers reveals that CIOs are dangerously disconnected from the business side of the house, customers and the executive's own users.

BY RALPH CARLYLE

In recent years, a cottage industry has grown up around the notion of the chief information officer (CIO). The CIO was to be an executive who straddled the worlds of business and technology and aligned the two. The idea caught on in the 1980s and today nourishes not only the top IS officers who usually fill the role but also the consultants, executive search firms and media that give the CIO industry its life. A new survey of the nation's top IS officers, however, shows that the CIO movement could be unraveling at the seams.

"Our 1990 survey is a series of red warning flags that point to dangers ahead," says Ron Brzezinski, a partner at the accounting and consulting firm of Coopers & Lybrand, who directed the Coopers & Lybrand/DATAMATION CIO survey. "And the dangers are many."

The previous two surveys, in 1988 and 1989, both showed that IS executives were battling unsympathetic corporate cultures and losing. These battles are still being fought. But this year's new survey of top IS executives at over 400 of the nations' top 1,000 companies shows CIOs to be their own worst enemies. Their biggest battle is with themselves. Many are still clinging to a paternalistic view of information systems users, seeing them as something to be controlled and manipulated rather than served. Thus, few of them relish the thought of managing in a decentralized environment, since they yearn for something they can control and get their arms around, not for some amorphous organizational culture that makes control more difficult.

Illustration by Richard Elmer

This is why many IS executives interpret the CIO role as leader or IS czar. "They are reluctant to serve the corporation," says Brzezinski, once a CIO himself at the Quaker Oats Co.

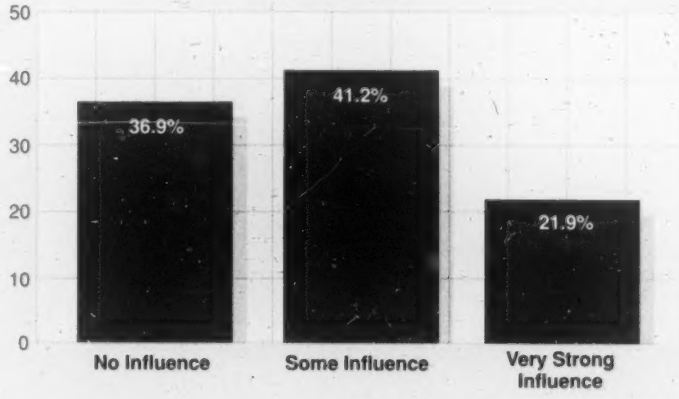
Being a servant of the corporation means being available to end users and the company's customers. It is apparent from the way top IS officers manage their time that this isn't the case.

Over 62% of their time is spent just running the IS organization—23.3% of it solely behind a desk. "They are not getting out, not in touch," says Brzezinski, who adds, "you can't align the worlds of business and technology from behind a desk."

CIOs aren't just spending less time with their own end users than they should, they are largely ignoring their ultimate customers, the people and companies their firms actually sell to. Only 2.7% of

CIOs Are Not Influencing Corporate Strategy

Seventy-eight percent of survey repondents say that IS is either having no effect or only a slight effect on the development of their company's business strategy.



Source: Coopers & Lybrand/DATAMATION 1990 CIO Survey

CIOs' time is spent with their companies' customers, thus making it difficult for them to handle the business issues associated with IS within their own companies. This seems to imply that CIOs are denying themselves direct experience with their ultimate customers, relying instead on indirect information from business managers within their own companies. A telling statistic is that CIOs spend far more time (4.4%) at industry conferences—many of which discuss what the role and the agenda of the CIO should be—than in front of their companies' customers.

When asked how they should allocate their work schedules, the CIOs said they wished to reduce their desk time to about 19% of the total and would spend more time (6.2%) with the company's customers and speaking at and attending conferences (5.7%). But both figures are lower than the 8.7% of their time (just over four weeks) they would like to spend on vacation and personal days, activities which currently consume 7.7% of the CIOs' time.

Not Enough Business Savvy

A lack of direct business experience is apparent in other statistics, as well. Only 20% or so of CIOs were promoted or transferred to the top computer executive job from business management positions within their companies. Almost 6% came from operations; 5% from finance, about 2% from planning, 1% from marketing/sales, close to 1% from administration and 5% from the Other category. The remaining 80% were either hired or promoted from IS positions, with 50% coming from other companies and 30% promoted from IS jobs within their own companies. Of the 80% hired from outside, 24% of the hires came from executive search firms.

CIOs don't seem to be highly in touch with the computer industry at large either, as a quiz on their general knowledge revealed. The CIOs were given the 20-question quiz at the Coopers & Lybrand CIO Forum held this spring in Miami. The average age of CIOs taking the quiz was 47 years. Nearly two-thirds of all of them earn $100,000 or more per year, with 6.5% earning more than $300,000. On average, they had been in the industry for 20 years. The most questions even answered was 15, and the best score was 9, a failing grade by school standards. Almost 20% of those answering didn't know that IBM's current flagship operating system is MVS. Forty percent didn't know the name of the head of the world's largest independent software vendor, Charles Wang of Computer Associates International Inc. Only 80% knew that Digital Equipment Corp.'s latest supermini is called the 9000 series. And none at all knew that the series number of IBM's first general purpose computer was the 701.

The quiz is hardly scientific, but it does suggest that CIOs may be losing touch with their technological roots as well as with the business side. This impression is further confirmed in the Coopers & Lybrand/DATAMATION 1990 CIO survey. To assess the impact of five areas on their jobs in the 1990s and their degree of preparedness to handle issues arising in those areas, respondents were given a scale of 1 (minimal) to 10 (significant). The five areas were business environment, IS organization, technology, applications and globalization. Under these five categories were listed a total of 29 issues. An average score of 7 or more was registered for only eight of the 29 issues. Scores of 7 and 8 mean the issue has above-average significance. Scores of 5 and 6 were the norm and indicated that the issues were of only average concern or had average impact.

In the turbulent 1990s, when the only rule seems to be everything is changing at all times, these scores not only show a lack of preparedness but a lack of urgency and intensity. "The CIOs seem to be comfortable without just cause," says Brzezinski.

Many of the CIOs were caught short by the PC when it emerged, and because they weren't ready for it they fought it, and lost. "Now as we move into the multimedia technology decade, there's a danger of the same thing happening again," warns the C&L partner. Integrating and applying multimedia technologies for business solutions was one of the 29 categories. CIOs rated it only 18th on the job impact scale with a 6.17. In terms of preparedness, it scored a tiny 5.23 and was only 23rd on the list.

> You can't align the worlds of business and technology from behind a desk.

Perhaps the CIOs' response to the issue of outsourcing was the most amazing of all. This category scored a 4.28 on impact and a 4.82 on preparedness—26th and 25th, respectively. One leading IS executive was astonished at this score, and echoed the view of many IS leaders polled by telephone after the survey results were known. "Any IS executive who doesn't put outsourcing near the top of his or her list of concerns simply isn't living in the real world," says Harry Wallaesa, vice president of MIS at the Campbell Soup Co. of Camden, N.J. "You have to perform a make or buy evaluation on everything you produce within the IS organization. Anyone not concerned about outsourcing is not concerned about the cost of the service provided to clients."

Many of the CIOs were caught short by the PC when it emerged. They fought it, and lost.

How CIOs Rate the Issues

On a scale of 1 to 10, with 10 being the most significant, CIOs rate the impact of various issues on their jobs and their preparedness in dealing with these issues.

	Impact	Prepared-ness
Business Environment		
Increased management expectations	7.47	6.72
Embedded IS in products, services	6.49	5.90
Reshaping business processes	7.24	6.01
The IS role in changing company cultures	6.41	5.67
Sharing applications management & ownership with business units	6.34	6.35
Linking the business to suppliers and customers via IS	6.44	5.83
Peer/CIO politics	6.04	6.00
Establishing a strategic role for IS	7.18	6.54
IS credibility	7.64	6.92
IS Organization		
Retraining, acquiring & keeping IS staff skills	7.51	6.51
Redefining technology, data & applications strategies & architectures	7.44	6.40
IS career paths	6.04	5.57
Changing centralization/decentralization roles & responsibilities	6.01	6.11
CASE tools changing the development process	5.80	4.84
Outsourcing of services	4.28	4.82
Repositioning/restructuring the extended data center	4.96	5.35
Technology		
Integrating & applying multimedia technologies	6.17	5.23
Desktop complexity & support	6.71	5.91
Consolidation of technology vendors & alternatives	5.58	5.86
Major new technology products	6.11	5.87
Establishing & maintaining enterprise technology standards	6.43	6.06
Managing & supporting new generations of LANS	6.51	6.06
Applications		
Rebuilding the application infrastructure	7.27	6.21
Expert systems or AI as integral components of business systems	5.29	4.18
Managing the enterprise data repository	7.04	5.85
Managing the enterprise software repository	6.50	5.94
Globalization		
Worldwide systems development	3.52	3.28
Worldwide operations	3.52	3.39
1992 changes	4.20	4.03

Source: Coopers & Lybrand/DATAMATION 1990 CIO Survey

The most staggering thing about the general knowledge quiz and the survey is that these answers come from the nation's IS elite: 19% of those responding actually bear the title of CIO, up from 14% three years ago. A further 35% are at the vice presidential level, up from 32% in 1988. Most remarkable of all, however, is that almost 52% of these executives viewed themselves as trend-setting users of IS technology. Only 32% said they were "average" and less still, 16%, saw themselves as "followers." This answer seems to suggest that these IS executives feel they are prepared for the uncertain 1990s.

"They are answering emotionally," counters Brzezinski. "Nobody can bear the thought of being a follower or merely average, but statistically, many CIOs must fall into these categories."

Brzezinski says that this self-delusion is the single biggest danger CIOs face in the 1990s, but that it's not too late for them to turn things around. "It'll mean a personality change for many of them."

The first thing CIOs must do, Brzezinski says, is transfer their loyalty from their profession to the companies they work for. Many are reluctant to do so, he feels, because demand for computer-related skills has been so great that job hopping often nets IS specialists lucrative advances in terms of salary, benefits and promotion. Thus, IS workers tend to be more profession- than organization-oriented. Their interest is in using the organization to develop personal skills that will be more marketable in the churning computer-related job market.

The higher up the IS executive career ladder a person goes, the more noticeable the job hopping becomes. The CIO survey shows that directors of IS are more stable than VPs and CIOs. Just over 45% of the directors have had one other top job in their career. Over 31% of those carrying the VP IS title have had three or more top jobs in their careers. At the rarefied heights of the CIO almost 51% have had three or more top positions.

Over one third of the total survey population have been the top IS people in two companies other than their present employers.

In the finance sector, this job hopping is more noticeable—and more lucrative—than in other business segments. Recruiters say that CIOs typically earn $350,000 in the financial services sector, compared with a $125,000 average in the C&L survey population as a whole. It's not uncommon, they add, for financial industry CIOs to be paid $1 million+ salaries. Each time these top IS officers shift companies, they typically hike their salaries by around 25%, say experts.

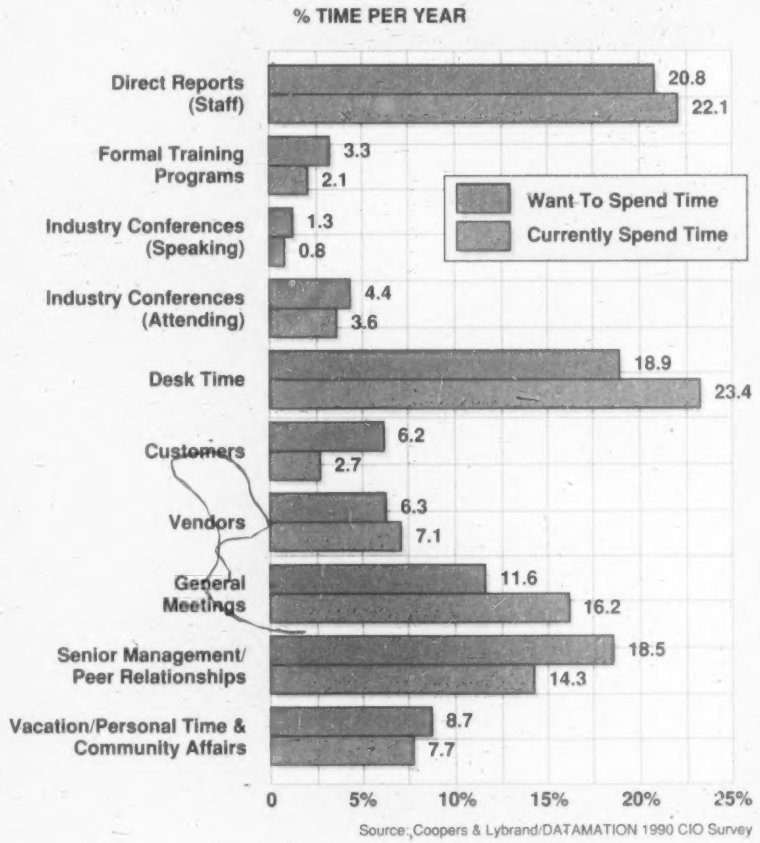
This high-stakes job hopping has not only hyperinflated CIO salaries and benefits, but has had two other consequences as well. One result shows up in a survey finding that CIOs identify human resource executives as their least supportive executives. This is confirmed by John J. Davis, head of New York City-based executive search firm John J. Davis & Associates. "One, it's turned the VP [of] Human Resources into an enemy of the CIO," says Davis, whose company makes its money placing IS executives in the $200,000-a-year and up range. The reason is that the well-ordered salary and benefits structure of the human resources department is thrown out of whack with every CIO job hop. The C&L survey shows that the vice president of human resources is far and away the least supportive of the CIO amongst all executive classes.

The second result of the CIO job hopping is that IS executives are replicating solutions at each company they go-to. "It's human nature to reproduce what worked in the past," says Brzezinski, "but it's the wrong thing to do. CIOs must take a fresh look at today's problems." He believes the mean age of

Any IS exec who doesn't put outsourcing near the top of his or her list of concerns isn't living in the real world.

How CIOs Spend Their Time and How They Want To

Only 2.7% of a CIO's time per year is spent with company customers, while 39.6% of the time is devoted to general meetings and sitting at the desk.



Source: Coopers & Lybrand/DATAMATION 1990 CIO Survey

the survey population, 47 years, prevents many from doing this. "They've become set in their ways."

The sales and marketing side of the CIO's company, in particular, is likely to be most upset by regurgitated IS solutions, since these areas' requirements change constantly, and they are looking for innovative tools to help them keep ahead of customers. That's why the VP of sales/marketing was cited by CIOs as the second least supportive member of the executive suite.

Brzezinski believes that CIOs must transfer their loyalty from the IS profession to the company and become servants of the corporation. He believes that, if those two steps are taken, CIOs will begin to transform themselves from self-deluded outsiders to in-touch agents of change. But a further step is also required. CIOs must discover who their allies are. "It also helps to know who your friends are," he adds. "The CIOs identified that the CFO is their biggest supporter. And yet this is the executive that top IS executives least want to report to." Brzezinski notes that most CIOs (82%) feel they can have more impact in their companies by reporting to either the CEO or chief operating officer. He says, though, that the CIO should not to lose the CFO's support.

Business Managers' Power

But even if these steps are taken, and the reporting relationships work well, there is a school of thought that insists that it is already too late for CIOs, that, in essence, the whole movement is doomed. "It's not ego problems, or rigid personality, or even being out of touch that will sink the movement," says Positive Support's Janulaitis. "It's something else entirely." Janulaitis and others stress that the control of technology is being transferred away from the IS organization and into the hands of business managers. These managers have the business skills that out-of-touch CIOs lack. They also increasingly have control of the IS budget and can use outside companies to get the applications they need.

"IS executives that can't work with these business managers will become redundant," says Walter X. Kane, a 30-year IS veteran and vice president of IS for the Neponset Valley Health System Inc. of Norwood, Mass. "Even those that can may suffer a similar fate."

The C&L survey shows that the new business managers are already ascending in companies. The average annual IS budget at companies on the survey was close to $86.6 million. CIOs controlled $32 million of this directly and approved $18.5 million of indirect spending. That leaves $36.1 million, or almost 42% of the total, in the hands of the business managers. "And everywhere you look the percentage is growing," says Kane.

As technology becomes more of a commodity and further standards emerge, companies probably won't need a large IS organization, many experts believe. A small team of advanced technologists headed by a chief technology officer may be sufficient for companies to create the pipes and connections that will link their computer networks.

For CIOs, the choice seems to come down to two things: they can stay in a shrinking backwater operation—the data center, in essence—or seek new growth within their organizations as business managers. To go down the latter road, they must open up their personalities and connect. They must come out from behind their desks and from behind their notion of the CIO as a leader and DP czar.

"We've got to become the kind of person that gets a kick out of helping others succeed—the type that goes to a party and leaves his ego at the door," advises Bruce Brinick, vice president of IS at the Aviation Office of America Inc. in Dallas. "We've got to stop being the reluctant servant."

486 PC Systems: Not Ready for Prime Time

Intel's new 80486 microprocessor packs a lot of power for numerically intensive applications. But until prices come down and 486-specific software becomes a reality, a cautious buying approach seems warranted.

BY EMILY LEINFUSS

As personal computers based on the 80486 microprocessor from Santa Clara-based Intel Corp. start to trickle out, IS decision makers seem pretty clear about where they think the 486-based machines will fit into their organizations now and over the next few years. Only a few of them are moving quickly to embrace the 486 in large numbers, at least for now.

Companies that are only after speed and power—particularly for computationally intensive applications—are buying 486s today, and their power gluttons are using the machines with glee. The reason to upgrade from a 386 to a 486 seems obvious if you look at the choice purely from a power perspective. According to Intel's own benchmarks based on integer and floating point measurements, performance of a 486 falls somewhere between 1.5 to twice times that of a 386 running at the same clock speed.

But many analysts contend that the speed of a 386 is more than adequate for most PC applications. They consider that the real leap forward in microprocessor technology occurred in 1986, with the long-awaited introduction of 386-based computers. At the time, the MS-DOS community leaped from the 16-bit architecture of 80286-based PCs to the much faster 32-bit architecture of the 80386. Those buying computers for more than raw computing power alone must ask some important questions before upgrading their 386 user base to 486 machines.

One essential question deals with price. At what point in the inevitable price erosion cycle will the 486 be worth the performance gains? Although the issue of price/performance is never easy to quantify, 486 machines are clearly priced at a premium over high-end 386 PCs. Lower cost, bare-bones 486 machines are starting to hit the market with price increases of $500 to $2,000 or

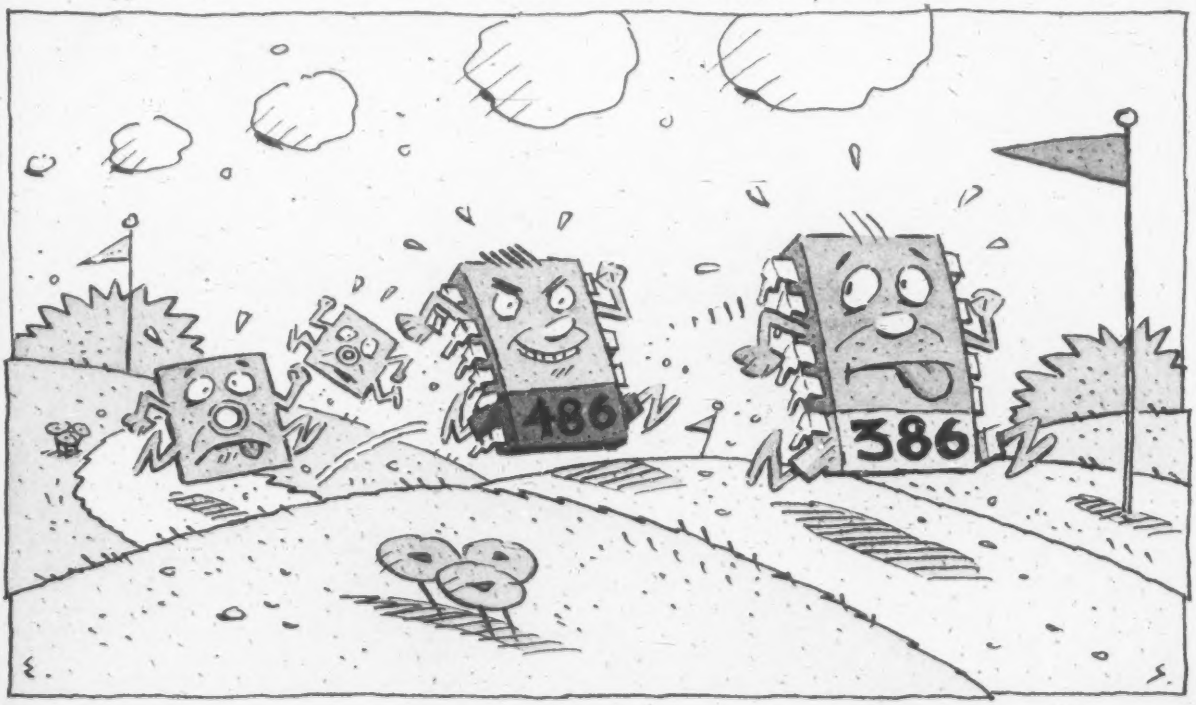


Illustration by Elwood Smith

more over their 386 counterparts. In time, the gap should narrow, as the price difference between 80286 and 80386SX machines has done.

But price is just part of the picture. Most potential 486 buyers are equally concerned about software. When will we see software that will truly exploit the 32-bit technology of both the 386 and the 486 chips? Will that software be more expensive and harder to implement for 486s than for 386s? After asking these practical questions, most companies wind up taking a conservative, wait-and-see attitude toward the 486 machines.

Today, four years after the 386 introduction, users are still waiting for a new generation of software that fully takes advantage of the 32-bit architectures of either the 386 or 486. Although some software is appearing in the form of MS-DOS extenders such as Microsoft Windows 3.0 that break the 640 kilobyte DOS memory barrier, most packages today do not take advantage of the newer chips beyond the obvious gain in speed.

Where the 486 Stands Out

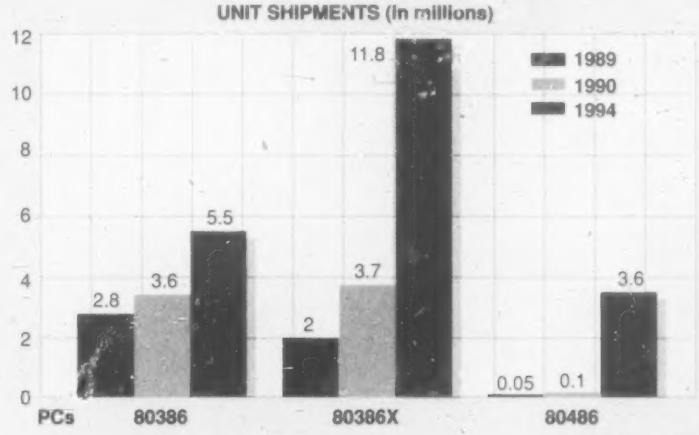
Even without 32-bit software, however, IS professionals have three clear reasons for choosing the 486 today. First, the 486 is fully upwardly compatible with the 386, so it will run any software that runs on the 386, including the MS-DOS, UNIX and OS/2 operating systems. Second, the 486 boasts a built-in, integrated, floating point numeric coprocessor. Achieving comparable performance on a 386 machine requires the addition of the 80387 coprocessor or an equivalent chip. Third, the 486 has a small internal memory cache system that improves performance. What all this adds up to is at least double the processing speed for the 486 over its 386 sibling.

☐ THE SPEED OF A 386 IS MORE THAN ADEQUATE FOR MOST PC APPLICATIONS.

According to manufacturers, most 486 machines sold to date have been adopted in two major areas: as network fileservers and as specialized, performance-sensitive applications such as software development and computer-aided design and engineering (CAD/CAE). For the most part, these are the same applications for which the 386 machines were initially targeted four years ago. The inevitable reduction in price, however, has driven the 386 into the mainstream of business computing.

Tomorrow's Chip du Jour

By 1994, worldwide shipments of PCs using the 80486 will begin to approach those based on the 80386. But for now, gaining market share is an upstream battle.



Source: Dataquest

One response to the need for a 486 is characterized by Terence Colligan, president of Rational Systems Inc., a Natick, Mass-based software developer. "The 486 was purely a speed purchase. It wasn't a lot more expensive than the 386 system we had, and it was almost twice as fast for the work we were doing."

Still, most manufacturers and users do not believe the 486 machines will become general purpose PCs for quite a while. In fact, they see the machines fitting into the very high end of the PC envelope and nosing their way into areas where dedicated engineering workstations and even minicomputers are the usual fare. For example, a fully configured 486-based system, optimized for CAD applications, costs between $10,000 and $15,000. That is minimal when compared with the cost of a traditional dedicated engineering workstation, says Pradeep Jatwani, marketing manager of Hewlett-Packard Co.'s North American PC division in Sunnyvale, Calif.

A Niche Market

Rick Eder, information technology coordinator at Rochester, N.Y.-based Eastman Kodak Co., believes that, right now, there is a place for each processor, and each processor has its place. He says the capabilities of the 486 chip, primarily its caching and integration with the floating point coprocessor, are suitable for numerically intensive engineering and research applications. The 486 will also find a niche in the emerging high-performance fileserver market, he says.

Eder does not believe the average desktop user needs 486 capabilities, at least not yet. For many business applications, the 386 chip is sufficient because it supplies the 32-bit architecture needed to run tomorrow's applications.

In its engineering area, Kodak has several 486 machines that are being used specifically for high-end CAD/CAE applications. The firm also evaluated the fileserver market where, says Eder, many of the offerings are 486-based. Price is also a factor with Eder when evaluating 486 machines. In the CAD arena, he says, the machines are starting to show up in an affordable range. "We are going for the right performance for the right price and for the right application at this point. That's the way we see it divided up."

Waiting It Out

Noxell Corp., a manufacturing firm in Hunt Valley, Md., is just beginning to evaluate 486 machines. John Kusik, Noxell's manager of systems planning, says most of his firm's machines are of the 386 and 286 persuasion. Kusik is cautious about 486 computers and is waiting for the bugs to be worked out. Some of the early 486s brought in were having problems with the small computer systems interface (SCSI) controllers, he says.

Kusik says that if Noxell's users demonstrate a real need for 486s, he may get them. But he doesn't see much of a need at this point. His power users, who mostly use spreadsheet applications, are getting

by with 386 machines. Where Kusik sees the 486 eventually falling into place at Noxell is in certain graphically intensive applications and as network servers.

Another firm that is not jumping too quickly on the 486 bandwagon is New York City-based accounting and consulting giant Ernst & Young. According to Rick Richardson, the firm's director of technology, Ernst & Young is sticking with the 386, at least for now. Few Ernst & Young power users need 486 PCs immediately, says Richardson. And until prices come down and the 486 emerges as more of a commodity, migrating to the 486 is not going to be a big issue. Richardson also says his firm has few users doing CAD/CAM or compute-intensive kinds of applications where a 486 would be the way to go.

Bill Laurence, technology manager at the San Onofre Nuclear Power Station

□ THERE IS A PLACE FOR EACH PROCESSOR, AND EACH PROCESSOR HAS ITS PLACE.

in San Onofre, Calif., says he, too, sees no ultra-compelling reason to migrate from the 386 to the 486. Although some of his CAD users have the new machines, he says the benefits in most cases don't seem to be significant. Laurence sees a streak of conservatism evident in IS purchasing these days. He claims many IS managers want other companies to wrestle first with new and tricky applications before they commit to the technology.

He also feels the lack of software plays a role in the slow adoption of the 486. For example, he says if a 486 version of AutoCAD were marketed today (Sausalito, Calif.-based Autodesk Inc. does have a 386 version of its product) he would be buying a lot more 486 machines.

The Fileservers Are Coming

Despite vendor insistence that 486 machines are being used as network fileservers, most IS executives have yet to actually implement the machines in this way.

Barry Livingstone, chairman of the 486 Standardization Committee of the New York Micro Managers Association, has been testing a 486 as a network fileserver despite the lack of networking software. Livingstone calls the situation a catch-22. The manufacturers of networking software, he says, are starting to develop 486-specific features in their software, for which they will charge a premium. But, as of today, those features are just not available.

"One manufacturer of network software charges you more if the system is running on a 486. They have a [486 recognition] feature in their code, and unless that feature is enabled by the manufacturer, the code will not run. Yet you have to pay them the extra fee," he says. According to Livingston, some vendors charge extra for 486 software extensions that, as yet, deliver no added functions.

Livingstone says users want proof that the 486's performance increases will outweigh the increase in price over the 386. "The 486 [machine] is not going to look any faster to the user if it doesn't really take advantage of any 486 [microprocessor] features," he says.

Still, despite all the debates of the merits of the 486 versus 386 microprocessors—all of the balancing and measuring of price, performance, operating systems, applications software and networking environments—there is one issue that all IS professionals are very clear about. The day will come, probably in no less than five years and no more than 10, when 486 machines will be at the lower end of the PC market.

At that point, although IS decision makers will be upstream from where they are today, they'll still be caught in a similar tidal pool. The 486 will be the mainstream chip, and they will be trying to figure out where the 586, the x86 and beyond, will fit best into their computing environments. □

Emily Leinfuss is a freelance writer based in Sarasota, Fla.

A Vote in Favor of the 486

One technology manager who sees a large need today for 80486 machines is Keith Fletcher, network administrator at Warner Lambert Co., a pharmaceuticals company based in Morris Plains, N.J. Fletcher is testing various 486 machines for speed, compatibility and price. Eventually he plans to use the machines as fileservers, but currently his firm is testing 486s on database-intensive applications and for some programming tasks.

Fletcher warns that the microprocessor alone is not the end-all when it comes to speed. He says he found that a 486, 25-megahertz machine is roughly as fast as a 386, 33MHz machine when running many applications. "You just aren't going to get a whole lot more speed out of the 486 chip when the clock speed is slower than the 386 chip," he contends. But the newer 33MHz 486 chip—currently available in limited supply—does considerably outperform the 386 running at the same clock speed.

Fletcher feels that the 486, with its built-in coprocessor and memory cache, represents the first generation of superchips that are on the way. Already, he is beginning to download mainframe database applications onto machines using the 486. "Once you have this level of power on your desk, you can easily work with large quantities of data, like the mainframe does," he says.

Although Fletcher is curious about new software that will eventually take advantage of the 386 and the 486 chips, he needs more power for his users right now. "We need maximum power with existing software, so we are looking for the fastest processor we can get. Eventually, we are going to have maximum power with the new software, and that will be even better."

"Gloria, just when was this airbag installed on my desk?"

Ringing Up New BusinessWith PBXs

Tap into digital PBX's data channel and unlock a wealth of information in corporate databases. Astute IS groups are using those data to create a smart phone system that dramatically improves the efficiency of telephone-based workers.

BY LAMONT WOOD

If you think of your organization's private branch exchange (PBX) as "that thing the phone operator sits at," you may have to readjust your thinking. The latest in digital PBXs will allow information systems groups to provide telephone users with a wealth of caller-specific data before they even answer the phone.

That may be a far cry from the notion promoted by telecom suppliers in the early 1980s that PBXs would be *the* data transmission technology. But PBX is emerging as a powerful, if more limited, tool for IS.

"PBX lost the battle for data dominance—that issue is dead," says H. Paris Burstyn, vice president of telecommunications for Cahners Business Research Group in Newton, Mass. "Now it serves as a bridge, linking data and voice."

As digital PBX becomes the technology of choice for integrated voice/data applications, it will take its place in the web of connectivity tools. Beyond voice/data applications, PBX's switching capabilities will allow it to be used selectively as a gateway, such as from local area networks to host computers.

Payoff in Telemarketing

Today, 85% of PBXs are digital. That capability allows them to carry automatic number identification (ANI) and dialed number identification service (DNIS) signals within a company's phone system. When those two pieces of data—who's calling and who's being called—trigger customer database searches and customized call routing, phone-based sales and service groups can achieve double-digit increases in efficiency.

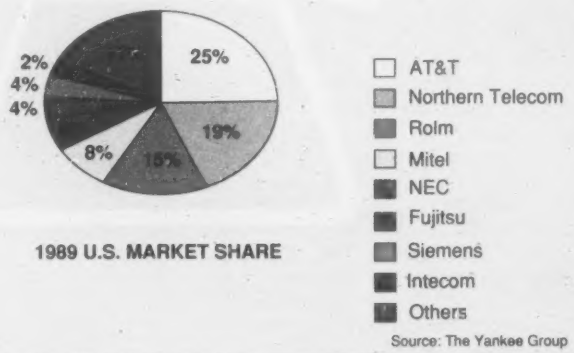
The most excitement revolves around ANI. ANI identifies the telephone number of the incoming call. Anonymous phone calls may become a thing of the past, a consequence that has aroused both opposition and support (see sidebar, "Will New Services Run Afoul of the Law?"). For businesses, the main attraction is that employees fielding the call know the caller's number. At minimum, that can provide a way to identify the customer by name and location. The telephone number can also be used to automatically retrieve database records—customer profiles, buying histories, service records, etc.—before the call is even answered.

ANI is increasingly available as part of T1 (i.e., 24-channel digital trunk) incoming 800-number services. Under Integrated Services Digital Network (ISDN) nomenclature, it's a PRI (primary rate interface) connection running "23-B plus D" (meaning there are 23 64-kilobit bearer channels and one data control channel). AT&T uses an out-of-band signaling scheme for ANI: the D channel carries ANI from the public network to the customer premises, where the PBX picks it up.

AT&T will be offering ANI in most of the country by the end of 1990, says Claire Diamond, an AT&T spokeswoman in Basking Ridge, N.J. Increasingly, local phone companies can be expected to offer single-line basic rate interface (BRI) ISDN connections incorporating two bearer channels and a control channel, which could also transmit ANI.

The Line on the PBX Market

AT&T, Northern Telecom and Rolm are the big players, but a host of other vendors are vying for PBX business.



1989 U.S. MARKET SHARE

Source: The Yankee Group

The DNIS service—identifying who's being called—has less obvious, but no less valuable, uses. Reservation and telemarketing agents often receive calls on multiple numbers for multiple advertising programs to a single phone set. With DNIS, the agent can know in advance which product is involved.

To take advantage of both ANI and DNIS, users of AT&T and US Sprint Communications Co. services must have ISDN. But MCI Communications Corp. now provides ANI and DNIS without an ISDN interface. It uses analog in-band signaling to carry these services over existing analog phone lines. In June, Northern Telecom Inc. became the first digital PBX manufacturer to support MCI's version of ANI with software enhancements (X11 release 16) to the Meridian 1 PBX that make it in-band capable.

Will New Services Run Afoul of the Law?

The future of automatic number identification may be decided not by technical merit or market attractiveness. The most controversial telecommunications feature in memory, ANI has become a battleground in the right to privacy war.

A Pennsylvania state court, for example, recently enjoined Bell of Pennsylvania from implementing ANI as an analog residential service. Known as Caller ID and available only on local calls, the feature was accused of contravening an existing state wiretapping law, as well as violating the right to privacy.

There's a bill before Congress that would guarantee every citizen the right to strip ANI from his or her outgoing calls. There is already a 900-number service in California that will forward your call with ANI stripped out.

Yet caller identification has already made considerable headway. New Jersey Bell reportedly has already signed up 60,000 consumers for Caller ID service at $12 a month. Peripherals that will display Caller ID are for sale from private sources in—believe it or not—Moscow. Back in the USA, emergency 911 services have been using a version of Caller ID in various places, so that simply dialing 911 may lead to a visit from a patrolman, and people have blamed false alarms on their dogs. Whether ANI has picked up enough momentum to carry it past the opposition remains to be seen.

Working Smarter

Creative use of ANI and DNIS to tap into customer records allows telephone sales and service groups to focus their efforts.

"With this combination of data processing and telecommunications, you have a telemarketing system on which you can simply turn up the volume," says Al Subbloie, vice president of Information Management Associates Inc., a software firm in Trumbull, Conn. "You can call more people, be smarter about who you call, establish a marketing database while on the phone and cross market later on. Customers [using ANI] report 40% improvements over previous manual telemarketing methods just selling to a repeat customer base."

> □ ANI USERS REPORT SUBSTANTIAL SAVINGS OVER MANUAL TELEMARKETING.

Subbloie adds that the use of "predictive dialing" (which indicates if calls dialed by a computer are actually answered so that a person in the company can pick up the phone and talk to the party contacted) can increase productivity by 10 to 12%, since the manual misdialing rate is at least that high.

"You can analyze the demographics of your calls and buy lists of people who match those demographics so you can sell your products to them," says Dana Blankenhorn, editor of the "Teleputing Hotline," a telephone industry newsletter in Atlanta. "You may find that your best customers are 60-year-old gun owners, so you would seek lists of other 60-year-old gun owners."

"There are a lot of fascinating things you can do with it [ANI and DNIS]," says Dennis Fieldman, vice president of research and development at Communicator Asystance Systems Inc., a software firm in Chelsea, Mass. "You often call a firm for a specific reason, which the firm taking your call could anticipate.

"If you called an auto agency," continues Fieldman, "they could see from your number that you have a car undergoing repair there and transfer your call to the right extension automatically. With ANI, the first person who answers your call can know your potential needs. And, many people who call in are not exactly facile and articulate, but with their file on the screen the agent can prompt them, so that less time need be spent on the phone."

Linking PBXs to Databases

Fieldman's comment points to a future for digital PBX's novel features beyond telemarketing. Many corporate organizations could benefit from smarter telephone answering and call routing. But exploiting these capabilities requires a request and status link connection between your PBX and your database computer. Such connections are surprisingly uncommon.

"Usually, you find an MIS department which owns its hardware and a separate telecom group, and the two aren't merging their products," says Bill Lucas, telephone systems supervisor for Amoco Corp. in Chicago and head of the AT&T Definity/85 Users Group. "That's just the way it's always been." Another user group official said he didn't know of any PBX users with computer integration.

Vendors are certainly making plans for when the users discover computer integration. "We want to make a switch and not a processing device, and I think most of the other PBX manufacturers will go that route," says Joe DiGraziano, manager of sales engineering at Mitel Corp. in Boca Raton, Fla. "Most will have their own agreements with off-board processor makers for integration purposes."

IBM, for one, announced in May that it has developed CallPath Services Architecture, a protocol for linking processors with PBXs. Initially, it works with the IBM AS/400 and PBXs from Northern Telecom, Rolm Co. and Siemens AG. IBM says it will develop versions of CallPath for its various lines, from the System/370 mainframe down to the PS/2 micro. IBM also says it has been working with AT&T to integrate AT&T's Adjunct Switch/Application Interface (ASAI) protocol with CallPath. Fieldman and Subbloie are both building products around the CallPath architecture.

> □ WITH ANI, THE FIRST PERSON WHO ANSWERS YOUR CALL CAN KNOW YOUR POTENTIAL NEEDS.

Burstyn at the Business Research Group points out that ASAI, CallPath, Northern Telecom's ISDN/AP and other formats provide the tools for a new "virtual" generation of PBX. That's because the combination of digital hardware and new software tools has transformed PBX

from a dumb switch to an applications tool, one that IS groups will be closely involved in implementing.

Although advances are being made in software, most analysts agree that no dramatic technological changes are likely for PBX hardware in the next five years. For one thing, vendors have learned from experience that giving customers an incentive to replace PBXs often results in losing that user to a new supplier.

"The whole field has decelerated, the rate of innovation has slowed and it's hard to get new ideas funded," warns Howard Frank, chairman of Network Management Inc., a systems integration firm in Fairfax, Va. "There was a rush to get into the PBX market after deregulation in 1984, sparking a bloody price war that continues to this day.

Still, Ernest DeNigris, vice president at AT&T Communications Systems in Bridgewater, N.J., hints that the future might not be a desert of innovation.

"Some things are too proprietary to talk about—but the role of the PBX as [only] a provider of dial tones could change," says DeNigris. "Think of the PBX as being the point of access within the business to all kinds of sources of information.

"I'm not saying we want to integrate with LANs and have the communications equivalent of the home entertainment center," continues DeNigris, "but rather leverage off our expertise in switching information." He predicts that the cost/performance of PBX bandwidth will mimic the improvements seen in computer memory—in terms of line capacity, rather than costs per line.

□ NO DRAMATIC CHANGES ARE LIKELY FOR PBX HARDWARE IN THE NEXT FIVE YEARS.

"We don't see another new technology on the horizon," says James R. Mackey, director of applications, marketing and requirements at Rolm in Santa Clara. "We're going to optical fiber and satellites and those kinds of transmissions, but that's not new technology to us. In our view, what's important is having memory, speed and bandwidth."

Further than five years out, optical switching and other technologies may bring profound improvements in memory, speed and bandwidth. But, for the near term, the action is sure to be centered on applications development. "When general computers came out, they moved from crunching numbers in the back office to real application engines involved in how people did business—and that's what's going on in the PBX market," comments Rick Faletti, vice president at Northern Telecom in Richardson, Texas. Users will be seeing more PBX-to-host connectivity so that the handling of calls can be completely customized, he says. He also predicts wireless PBX connections and phone numbers that follow you from your home, to your car phone and into the office.

While digital PBX hardware will remain recognizably the same for a while, it will be easier to integrate into an information system and will offer data of specific interest to IS. Unless, of course, you continue to see PBXs as "that thing the phone operator sits behind."

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